36. A process for cracking an olefin-rich hydrocarbon feedstock which is selective towards propylene in the effluent, the process comprising contacting a hydrocarbon feedstock containing olefins having a first composition of at least one olefinic component with a crystalline silicate catalyst having a silicon/aluminum atomic ratio of from 180 to 1000 to produce an effluent having a second composition of at least one olefinic component, the feedstock contacting the catalyst at an inlet temperature of from 500 to 600°C and being passed over the catalyst at an LHSV of from 10 to $30h^{-1}$, the feedstock and the effluent having substantially the same olefinic content by weight therein, and the effluent having a higher propylene content than the feedstock, wherein the feedstock is selected from the group consisting of a C_4 cut from a steam cracker and light cracked naphtha.

Remarks

This application has been carefully reconsidered in view of the Office Action of April 9, 2001. By this Amendment, certain amendments in the claims have been made. Reconsideration and allowance of this application is respectfully requested.

It is respectfully requested that the Final Rejection of April 9, 2001, be withdrawn as premature and not in compliance with the provisions of MPEP § 706.07(a) which addresses issuance of a Final Rejection on the second or subsequent action on the merits. In this respect it will be noted that applicants' claim 27, along with certain of other of applicants' claims, was initially rejected in the second Office Action dated March 1, 2000, under 35 U.S.C. § 102 over EP 109060. This rejection was traversed in the Amendment filed July 31, 2000. In the third Office Action dated October 10, 2001, this rejection was specifically withdrawn in favor of a rejection of claim 27, along with other claims, under 35 U.S.C. § 103 in view of EP 534142. The

rejection, based upon EP '142, was traversed in the Amendment filed February 14, 2001. In the Final Rejection of April 9, 2001, the rejection of claim 27 over EP '142 was specifically withdrawn and in this Office Action, claim 27 was rejected under 35 U.S.C. § 102, along with other claims including claims 28-32 which were added by the previous Amendment, as anticipated by EP '060.

It is respectfully submitted that the Final Rejection of April 9 is premature under the practice set forth in MPEP 706.07(a). As stated there, a second or subsequent action on the merits shall be final "except where the examiner introduces a new ground of rejection that is neither necessitated by applicant's amendment of the claims . . ." Here, claims 28-32 were added by the previous Amendment. However, claim 27 was not the subject of any amendments, and accordingly, the introduction in the Final Rejection of a rejection of claim 27 as anticipated by '060 is respectfully submitted not to be in compliance with normal PTO final rejection practice, including the practice as enumerated in MPEP § 706.07(a). This would appear to be particularly the case here since earlier in the prosecution of this application, a rejection of claim 27 based upon EP '060 was specifically withdrawn in view of applicants' arguments.

Claim 27 is directed to the embodiment of applicants' invention employing two feedstocks, a light cracked naptha, and a second stream comprising C_4 olefins in order to reduce the overall heat duty of the process. While the '060 patent clearly does not disclose this process, applicants, by this Amendment, nevertheless have amended claim 27 in order to more specifically define the catalyst consistent with the definition of the catalyst in applicants' other claims. A similar amendment has been made in claim 20 to specify that the crystalline silicate catalyst has a silicon/aluminum atomic ratio within the range of 180 to 1000. In addition, claims 4, 5, and 6 have been cancelled and rewritten in independent form as claims 34, 35, and 36.

Appropriate amendments to claims 7 and 8 have been made in order to make these dependent from claim 34 and 35, respectively. It was thought best to place original claims 4, 5, and 6 in independent form since the subject matter of these claims directed to the specific feedstocks called for are not disclosed or suggested in the primary reference, EP 0109060.

Applicants will not here repeat the arguments made in the previous response filed February 12, 2001, other than to address certain additional points raised in the Office Action of April 9, 2001, and to further address the claims which have been placed in independent form and claim 27. Claim 27 is directed to the embodiment of applicants' invention in the second full paragraph of page 8 of the specification, the description starting with the last full paragraph of page 21 and carrying over to page 22, and Example 17 as described on page 42. As indicated by applicants' specification, the embodiment of claim 27 involves the use of two hydrocarbon streams, one comprising a light cracked naphtha and the other, a C_4 olefin cut. By blending these two streams in a single olefin cracking process, the result is a substantial decrease in the overall heat duty of the selecting process. The result is a reduced energy requirement to produce the effluent comprising propylene or other light olefins. As disclosed in Example 17 and Table 14, the mixture of the light cracked naphtha and the C_4 streams results in a product effluent stream having substantially the same olefin content but a substantially enhanced light olefin content including about 17% propylene and about 4½% ethylene from the feedstock which had a very low or no ethylene and propylene content. The subject matter of claim 27 as now amended recites a silicon/aluminum atomic ratio of from 180 to 1000 consistent with the silicon/aluminum atomic ratio as set forth in independent claim 1.

With respect to independent claims 34, 35, and 36 (formerly claims 4-6), applicants would again respectfully point out that the feedstocks called for in these claims are distinctly

different from the feedstocks disclosed in the '060 patent. To suggest that these feedstocks are chemically and physically similar to those in EP '060 is simply in error for reasons given in applicants' previous response.

With respect to the silicon/aluminum ratio of 180 to 1000 or the narrower ranges as called for in the claims, applicants will not repeat the arguments previously made. However, in regard to the Examiner's arguments made on the paragraph bridging pages 10 and 11 of the Office Action, applicants note the Examiner's comment: " . . . it would be expected that the results would be similar or the same when using the claim ratio in the EP process . . ." However, the fact remains that the results are not the same or similar and this is particularly so with respect to the ranges designating a lower limit of 300 in claims 28 and 31 (thus, a range of 300-1000) or the more preferred range of 300-500 as set forth in claims 29 and 32. Specifically, applicants would respectfully refer to Example 16, Fig. 9, as well as Examples 17 and 18 and the data set forth in Tables 14 and 15. Specifically, it will be noted that the data in Fig. 9 shows an enhanced propylene yield at the silicon/aluminum atomic ratio ranging from 300 up to near 500.

In regard to the response found on page 11 of the Office Action to applicant's previous arguments respecting inlet temperature, silicon/aluminum ratio, olefin partial pressure, and space velocity, applicants would again respectfully submit that the selection of the combination of these particular parameters, as set forth, for example, in claims 1, 13, and 14, is not in itself obvious to one of ordinary skill in the art. In this respect, it is respectfully submitted that the examiner's reliance on *In re Aller*, 105 USPQ 233 (CCPA 1995), as supportive of such a proposition is clearly misplaced. As shown by applicants' experimental work, the selection of this combination of parameters involves far more than the mere optimization of known result-effective parameters through routine experimentation. As stated in MPEP § 2144.05II(B), the

rationale of the principal as set forth in *In re Aller* is to be applied only when a particular parameter is recognized to be a result-effective variable. Thus, as stated in MPEP § 2144.05II(B), under the heading, "Only Result-Effective Variables can be Optimized":

> A particular parameter must first be recognized as a result-effective variable, *i.e.*, a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation.

The simple fact is that there is nothing in the prior art references to support the proposition that only the routine experimentation of a prior art recognized result-effective variable is involved.

In regard to the Examiner's analysis of the '060 patent and the statement made in the Final Rejection that there are no Examples 16-23 and 36, applicants would respectfully disagree. In this regard, attention is respectfully invited to the data presented in Table 3 found on page 10 of EP '060 and also the data presented in Fig. 1 and on page 7 under the heading, Example 36.

In regard to the paragraph bridging pages 11 and 12 of the Office Action, there is absolutely nothing in EP '060 which would suggest the selection of a silicon/aluminum ratio to produce a C_2-C_3 olefin content of at least 90%, as recited in claim 7, or at least 95%, as recited in claim 8. There is absolutely nothing in EP '060 to suggest the use of a catalyst having a silicon/aluminum ratio of 400. In fact, what EP '060 does disclose is the exact opposite of the catalyst used in applicants' invention when it suggests the use of Silicalite I having no aluminum present. The ratio of infinity is one disclosed in the reference, not one selected by applicants for the purposes of calculation.

In response to the arguments in the Office Action directed to claim 33, applicants would respectfully submit that there is absolutely nothing in the prior art references which would suggest the use of a silicalite catalyst in EP '060 having monoclinic symmetry. In fact, EP '060 teaches away from the use of silicalite of monoclinic symmetry. In this respect, for the

preparation of Silicalite I, EP '060 references U.S. Patent No. 4,061,724 (page 5 of the EP patent). The patent to Gross et al specifically discloses in the text immediately following Table B that the silicalite prepared there is of orthorhombic symmetry. Thus, if the issue of symmetry of the Silicalite I used in '060 arises, it is evident that one of ordinary skill in the art would construe '060 as suggesting the use of silicalite of orthorhombic symmetry. Again, the use of monoclinic silicalite in applicants' process becomes obvious only after a reading of applicants' specification.

In regard to the arguments presented on page 12 of the Office Action, application would respectfully note that even if the teachings of EP '060 and Cosyns are combined, the result would be a diene concentration far in excess of the diene concentration specified in claims 16-20. Also, the apparent argument that the results would be "similar or the same" simply flies in the face of the Cosyns disclosure of diene contents far in excess of that specified in applicants' claims.

As to the secondary references, Gajda and Kuehl addressed in the last full paragraph of page 12 of the rejection, to the extent the Examiner argues that the Gajda reference discloses silicon/aluminum ratios corresponding to those called for in applicants' claims, this is simply not the case. As noted in applicants' previous response, the teaching in Gajda is of a process to produce a much lower silicon/aluminum ratio. Further, it is again noted that Gajda does not disclose the use of a coordination complex for the removal of aluminum and Kuehl does not disclose a steaming process, but instead requires a pressure sufficient to maintain the treatment solution in the liquid phase.

For the reasons advanced above and in applicants' previous response, it is respectfully submitted that this application is now in condition for allowance, and such action is respectfully

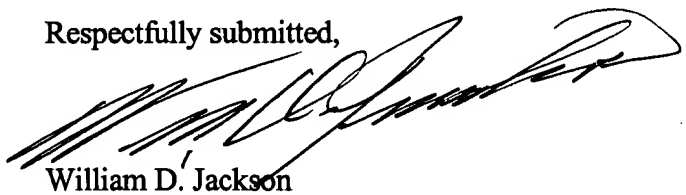
requested. Should this application be considered not to be in condition for allowance, it is respectfully requested that the Final Rejection be withdrawn as premature for reasons stated above.

Further, it is noted that applicants' attorney would welcome a telephone interview with the Examiner should the Examiner feel that this might expedite the prosecution of this application to a satisfactory conclusion.

Enclosed is a check in the amount of $110.00 to cover the fee for a one-month extension for the filing of this Amendment. The three-month period for filing a response to the April 9, 2001, Final Office Action was set to expire July 9, 2001, but with the payment of this extension fee, the response time is extended to August 9, 2001. Also enclosed is a check in the amount of 234.00 to cover the costs for the additional three (3) independent claims.

The Commissioner is hereby authorized to charge our Deposit Account No. 12-1781 for any further fees connected with this communication or to credit any overpayment.

Respectfully submitted,



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Attachment to Response (Amendment) to the April 9, 2001, Final Office Action:

In the Claims

Please amend the claims as follows:

Cancel claim 4 and rewrite in independent form as new claim 34.

Cancel claim 5 and rewrite in independent form as new claim 35.

Cancel claim 6 and rewrite in independent form as new claim 36.

7. A process according to claim [4] **34**, wherein at least 90% of the C_2 to C_3 compounds present in the effluent are present as C_2 to C_3 olefins.

8. A process according to claim [5] **35**, wherein at least 95% of C_2 to C_3 compounds present in the effluent are present as C_2 to C_3 olefins.

20. A process for the cracking of olefins in a hydrocarbon feedstock containing at least one diene and at least one olefin, the process comprising hydrogenating the at least one diene to form at least one olefin in the presence of a transition metal-based hydrogenation catalyst at an inlet temperature of from 40 to 200°C and an absolute pressure of from 5 to 50 bar with a hydrogen/diene molar ratio of at least around 1, and catalytically cracking the olefins in the presence of a crystalline silicate catalyst **having a silicon/aluminum atomic ratio of from 180 to 1000** at an inlet temperature of from 500 to 600°C and an olefin partial pressure of from 0.1 to 2 bar to produce at least one olefin having a different olefin distribution with respect to average carbon number than the at least one olefin in the feedstock.

27. A process for the catalyst cracking of olefins to lighter olefins, the process comprising contacting a first hydrocarbon stream comprising light cracked naphtha and a second hydrocarbon stream comprising C_4 olefins with a crystalline silicate catalyst **having a silicon/aluminum atomic ratio of from 180 to 1000** at a temperature of from 500 to 600°C and at an absolute pressure of from 0.5 to 2 bars to produce an effluent stream rich in lighter olefins.

Please add the following new claims.

34. A process for cracking an olefin-rich hydrocarbon feedstock which is selective towards propylene in the effluent, the process comprising contacting a hydrocarbon feedstock containing olefins having a first composition of at least one olefinic component with a crystalline silicate catalyst having a silicon/aluminum atomic ratio of from 180 to 1000 to produce an effluent having a second composition of at least one olefinic component, the feedstock contacting the catalyst at an inlet temperature of from 500 to 600°C and being passed over the catalyst at an LHSV of from 10 to $30h^{-1}$, the feedstock and the effluent having substantially the same olefinic content by weight therein, and the effluent having a higher propylene content than the feedstock, wherein the feedstock comprises a light cracked naphtha.

35. A process for cracking an olefin-rich hydrocarbon feedstock which is selective towards propylene in the effluent, the process comprising contacting a hydrocarbon feedstock containing olefins having a first composition of at least one olefinic component with a crystalline silicate catalyst having a silicon/aluminum atomic ratio of from 180 to 1000 to produce an effluent having a second composition of at least one olefinic component, the feedstock contacting the catalyst at an inlet temperature of from 500 to 600°C and being passed over the catalyst at an LHSV of from 10 to $30h^{-1}$, the feedstock and the effluent having substantially the same olefinic content by weight therein, and the effluent having a higher propylene content than the feedstock, wherein the feedstock is selected from the group consisting of a C_4 cut from a fluidised-bed catalytic cracking unit in a refinery, or a C_4 cut from a unit in a refinery for producing methyl tert-butyl ether and a C_4 cut from a steam-cracking unit.

36. A process for cracking an olefin-rich hydrocarbon feedstock which is selective towards propylene in the effluent, the process comprising contacting a hydrocarbon feedstock containing olefins having a first composition of at least one olefinic component with a crystalline silicate catalyst having a silicon/aluminum atomic ratio of from 180 to 1000 to produce an effluent having a second composition of at least one olefinic component, the feedstock contacting the catalyst at an inlet temperature of from 500 to 600°C and being passed over the catalyst at an LHSV of from 10 to $30h^{-1}$, the feedstock and the effluent having substantially the same olefinic content by weight therein, and the effluent having a higher propylene content than the feedstock, wherein the feedstock is selected from the group consisting of a C_4 cut from a steam cracker and light cracked naphtha.